WHAT IS CLAIMED IS:

1. A process for the destructive distillation of rubber to produce hydrocarbon and solid carbonaceous char, the process comprising:

heating rubber in the substantial absence of oxygen to a temperature sufficient to pyrolyze the rubber, distill a vapor comprising hydrocarbon from the rubber and produce a solid carbonaceous char;

partially condensing said vapor to produce a liquid fraction comprising hydrocarbon and a remaining gaseous fraction; and

contacting said carbonaceous char with a heat transfer gas to transfer heat from the char to said heat transfer gas and thereby cool the char, the heat transfer gas circulating in a circulation loop, said circulation loop comprising means for removing the heat transferred to said heat transfer gas from the char.

2. The process as set forth in claim 1 wherein the weight loss of the rubber as a result of pyrolysis is monitored and heating of the rubber is discontinued in response to the weight loss of the rubber or a function of the weight loss of the rubber.

3. The process as set forth in claim 2 wherein heating of the rubber is discontinued when the rate of weight loss of the rubber charge approaches zero.

4. The process as set forth in claim 1 further comprising reheating the cooled carbonaceous char to a temperature of at least 500 °C.

5. A process as set forth in claim 1 wherein the rubber is heated in a chamber for distillation of hydrocarbon therefrom, heat for the distillation being supplied by a radiant heating assembly comprising radiant heating tubes in which a hydrocarbon gas is combusted.

6. A process as set forth in claim 5 wherein the hydrocarbon gas combusted in said radiant heating tubes comprises a portion of said remaining gaseous fraction.

7. The process as set forth in claim 5 wherein said vapor comprising hydrocarbon is heated above its dew point with respect to the hydrocarbon to produce a superheated vapor, and heat is transferred from said superheated vapor to the rubber to contribute supplemental heat energy for distillation of hydrocarbon from the rubber.

8. A process as set forth in claim 7 wherein said vapor comprising hydrocarbon is heated to increase its temperature by at least about 10 °C.

9. A process as set forth in claim 7 wherein said vapor comprising hydrocarbon is superheated by contacting said radiant heating tubes with said vapor, and heat is transferred by indirect heat transfer from said superheated vapor to the rubber inside said chamber.

10. A process as set forth in claim 1 wherein the rubber is in the form of an assembly of whole rubber tires, said assembly being compressed to thereby increase the bulk density of said assembly.

11. The process as set forth in claim 10 wherein said compressed assembly of tires has a bulk density of at least about 250 kg/m^3.

12. The process as set forth in claim 10 wherein said assembly of whole rubber tires is formed by arranging the tires coaxially such that sidewall portions of adjacent tires in said assembly are in face-to-face contact.

13. The process as set forth in claim 12 wherein said assembly of tires is retained in its compressed condition by binding said assembly with at least one loop of flexible material.

14. The process as set forth in claim 13 wherein said loop of flexible material thermally degrades and ruptures as said assembly of tires is heated, thereby allowing the assembly of tires to expand and exposing increased surface area of rubber.

15. A process for the destructive distillation of rubber to produce hydrocarbon and solid carbonaceous char, the process comprising:

loading a charge of rubber into a first distillation chamber;

heating the rubber charge in said first chamber in the substantial absence of oxygen to a temperature sufficient to pyrolyze the rubber, distill a vapor comprising hydrocarbon from the rubber and produce a solid carbonaceous char;

partially condensing said vapor to produce a liquid fraction comprising hydrocarbon and a remaining gaseous fraction;

loading a second charge of rubber into a second distillation chamber; and

circulating a heat transfer gas between said first distillation chamber and said second distillation chamber, said heat transfer gas contacting said carbonaceous char in the first chamber and contacting said second rubber charge in the second chamber such that heat is transferred from the carbonaceous char to the heat transfer gas in the first chamber to cool the char, and heat is transferred from the heat transfer gas to the second rubber charge in the second chamber to preheat the second charge.

16. The process as set forth in claim 15 wherein said heat transfer gas is circulated between said first and second chambers for a time sufficient that the temperature differential between the char in the first chamber and the rubber charge in the second chamber is less than 10 °C.

17. A process for the destructive distillation of rubber to produce hydrocarbon and solid carbonaceous char, the process comprising:

heating a rubber charge in a distillation chamber in the substantial absence of oxygen to a temperature sufficient to pyrolyze the rubber, distill a vapor comprising hydrocarbon from the rubber and produce a solid carbonaceous char;

partially condensing said vapor to produce a liquid fraction comprising hydrocarbon and a remaining gaseous fraction;

monitoring the weight loss of said rubber charge in said chamber as a result of pyrolysis; and

discontinuing the heating of the rubber charge in response to the weight loss of the rubber charge or a function of the weight loss of the rubber charge.

18. The process as set forth in claim 17 wherein heating of the rubber charge is discontinued when the rate of weight loss approaches zero.

19. An apparatus for the destructive distillation of rubber to produce hydrocarbon and solid carbonaceous char, comprising:

a distillation chamber for holding the rubber, said chamber being sealable for the substantial exclusion of oxygen from said chamber;

heating means associated with said distillation chamber for heating rubber in said chamber to a temperature sufficient to pyrolyze the rubber, distill a vapor comprising hydrocarbon from the rubber and produce a solid carbonaceous char;

means for removing said vapor comprising hydrocarbon from said chamber;

means for condensing hydrocarbon from said vapor removed from said chamber to produce a liquid fraction comprising hydrocarbon;

means for circulating a heat transfer gas in a circulation loop, said heat transfer gas passing through said chamber and contacting said carbonaceous char to transfer heat from the char to the heat transfer gas and thereby cool the char; and

means for removing heat from the heat transfer gas circulating in the circulation loop.

20. Apparatus for the destructive distillation of rubber to produce hydrocarbon and solid carbonaceous char, comprising:

two distillation chambers for holding the rubber, said chambers being sealable for the substantial exclusion of oxygen from said chambers;

heating means associated with each distillation chamber for heating rubber in the chambers to a temperature sufficient to pyrolyze the rubber, distill a vapor comprising hydrocarbon from the rubber and produce a solid carbonaceous char;

means for removing the vapor comprising hydrocarbon from the chambers;

means for condensing hydrocarbon from said vapor removed from said chambers to produce a liquid fraction comprising hydrocarbon; and

means for circulating a heat transfer gas in a circulation loop, said heat transfer gas passing through both of said distillation chambers such that the heat transfer gas contacts solid carbonaceous char in one of said chambers and contacts a rubber charge in the other of said chambers, heat being transferred from the carbonaceous char to the heat transfer gas in said one chamber to cool the char, and heat being transferred from the heat transfer gas to said rubber charge in the other chamber to preheat the rubber charge.

21. Apparatus for the destructive distillation of rubber to produce hydrocarbon and solid carbonaceous char, comprising:

a distillation chamber for holding a rubber charge, said chamber being sealable for the substantial exclusion of oxygen from said chamber;

heating means associated with said distillation chamber for heating said rubber charge in the chamber to a temperature sufficient to pyrolyze the rubber, distill a vapor comprising hydrocarbon from the rubber and produce a solid carbonaceous char;

means for removing said vapor comprising hydrocarbon from said chamber;

means for condensing hydrocarbon from said vapor to produce a liquid fraction comprising hydrocarbon; and

means for monitoring weight loss of said rubber charge in the chamber as a result of pyrolysis.

22. The apparatus as set forth in claim 21 wherein the weight loss monitoring means comprises a load cell.

23. A pyrolysis oven comprising:

a housing defining an internal distillation chamber, said housing having an opening providing access to the distillation chamber;

a door adjacent the housing, said door being movable between a closed position in which the door substantially covers the opening and a gap is defined between said door and said housing and an open position in which the door is positioned away from the opening to provide access to the distillation chamber through the opening;

an inflatable sealing tube member, generally annular in shape, attached to one of said door and said housing adjacent the periphery of the opening so that said tube member is disposed within said gap when the door is in its closed position; and

means for introducing a fluid into said sealing tube member to inflate the tube member so that it sealingly engages

the other of said door and said housing around the opening when the door is in its closed position.

24. The pyrolysis oven as set forth in claim 23 further comprising means for circulating a cooling fluid through said sealing tube member.

25. The pyrolysis oven as set forth in claim 23 further comprising an inner gasket member and an outer gasket member, the inner and outer gasket members being annular in shape and attached to one of said door and said housing adjacent the periphery of the opening, the inner gasket member and the outer gasket member being attached to one of said door and said housing in spaced relation to each other such that the space formed between the gasket members is positioned to accommodate the sealing tube member between the gasket members when the door is in its closed position.